

Type code see overleaf



- Universal temperature interface
- 8-channel
- Inputs for T/C, RTD 2-, 3-, 4-wire, voltage and resistance
- Cold junction compensation
- Sensor diagnosis
- Variants for cabinet installation on DIN mounting rail
- Mountable in the field with various options for housings and cable connections
- Intrinsically safe, for mounting in Zone 1
- For FISCO and Entity
- Installation in Zone 2 as associated apparatus

Function

The 8-channel Temperature Multi-Input Device (TM-I) *-TI-Ex8.FF.* transfers signals from resistance temperature measuring sensors and thermocouples as well as resistance and millivolt signals via FOUNDATION Fieldbus.

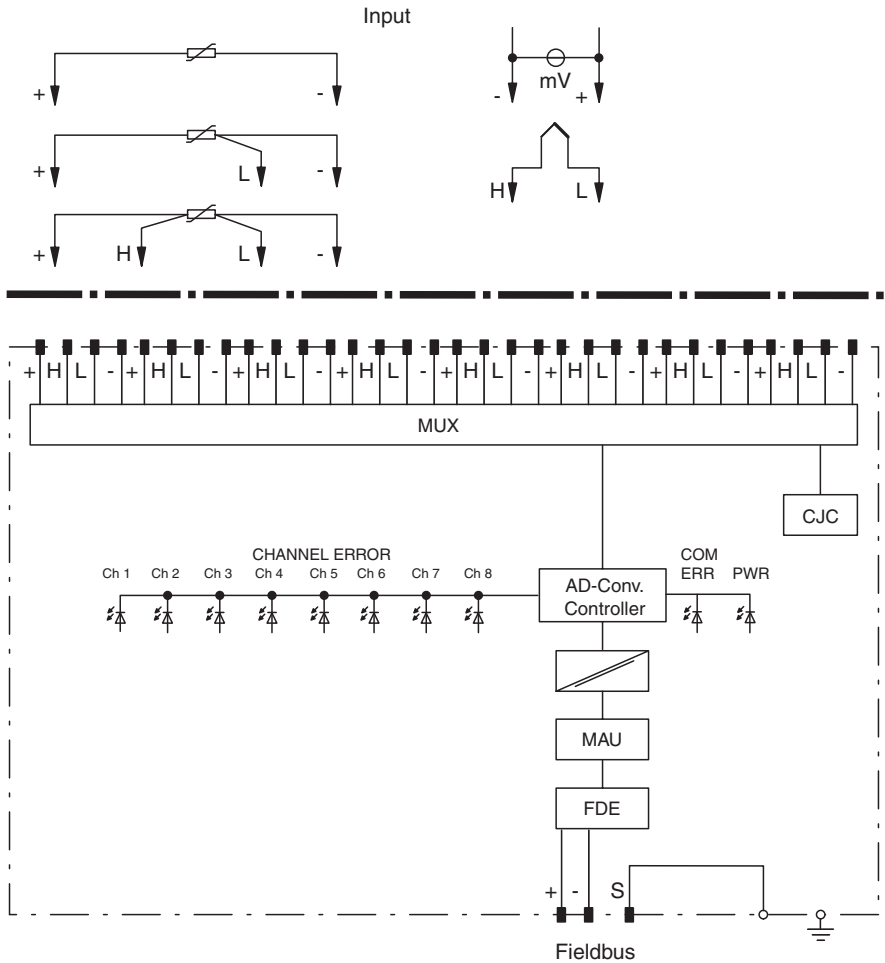
The TM-I is supplied from the FF H1 bus and can be installed as an intrinsically safe apparatus in zone 1 or as an associated apparatus in zone 2 of a hazardous area. The temperature sensors can be installed in zone 0, irrespectively of the location of the TM-I.

It is available as DIN rail mountable version as well as with different housings for field mounting. The housings allow different cable glands.

Data transfer is achieved via the function blocks 8xAI and 1xMAI. The transducer block "Concentrator" allows effective parameter assignment of the relevant parameters for temperature measurement. Each input can be parameterised individually.

Sensor diagnoses, such as lead breakage and short-circuit, are supported. Cold junction compensation for thermocouples is integrated.

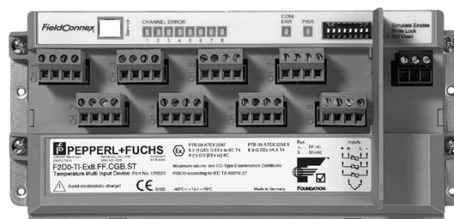
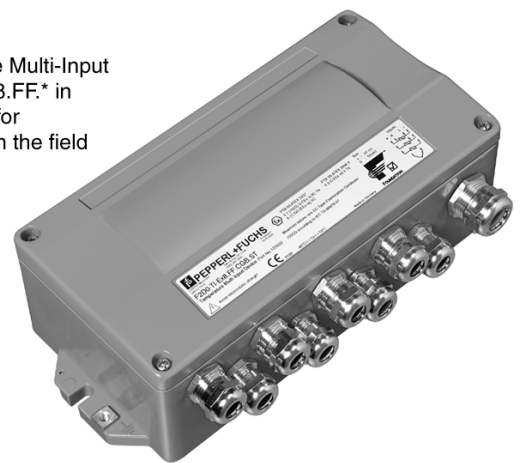
Connection



Composition



Temperature Multi-Input F2D0-TI-Ex8.FF.* in F2 housing for installation in the field



Temperature Multi-Input RD0-TI-Ex8.FF.* for cabinet installation on DIN rail

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Fieldbus interface	
Fieldbus type	FOUNDATION Fieldbus
Physical layer profile	profile type 511 (FISCO), profile type 111 (Entity)
ITK version	4.51
Implementation	resource block1x RS function block8x AI, 1x MAI transducer block8x sensor TB, 1x concentrator TB
Execution time	AI, MAI 40 ms max.
Macro cycle	typical for one device 8xAI or 1xMAI ≤ 500 ms
Firmware update	via separate plug connection
FDE (Fault Disconnect Equipment)	6.7 mA
Polarity	not polarity sensitive
Rated voltage	9 ... 32 V
Rated current	≤ 23 mA
Indicators/operating means	
LED PWR	green: on, bus voltage existent
LED COM ERR	red: continuous lightning: hardware error; 2 Hz flashing: no bus activities or bus fault; off: no error
LED CHANNEL ERROR	red: 2 Hz flashing: lead breakage, overrange; off: no error
Input	
Number	8
Sensor types	see table 3
Grounding	grounding of thermoelements possible
Error detection	lead breakage, wiring error, hardware device error
Common mode voltage	Input to Input 600 V _{peak}
Transfer characteristics	
Deviation	
Cold junction compensation	± 0.5 °C (32.9 °F)
Resolution/accuracy	see table 4
Linearization	T/C input 0.1°C RTD input 0.03°C
Internal measurement cycle	for all sensor types ≤ 1 s
Electrical isolation	
Fieldbus/inputs	safe galvanic isolation acc. to EN 60079-11, voltage peak value 375 V
Directive conformity	
Electromagnetic compatibility	
Directive 2004/108/EC	EN 61326-1:2006
Standard conformity	
Electrical isolation	EN 60079-11
Electromagnetic compatibility	NE 21:2006
Protection degree	IEC 60529
Fieldbus standard	IEC 61158-2
Shock resistance	EN 60068-2-27
Vibration resistance	EN 60068-2-6
Ambient conditions	
Ambient temperature	see table 1
Storage temperature	-40 ... 85 °C (-40 ... 185 °F)
Relative humidity	≤ 95 % non-condensing , for DIN rail version only
Shock resistance	
R... DIN rail housing	15 g
F2... aluminum housing	15 g , 11 ms
Vibration resistance	
R... DIN rail housing	5 g 10 ... 150 Hz
F2... aluminum housing	10 g , 10 ... 150 Hz
Corrosion resistance	acc. to ISA-S71.04-1985, severity level G3
Mechanical specifications	
Connection type	plug-in terminals
Core cross-section	
Bus	up to 2.5 mm ²
Inputs	up to 2.5 mm ²
Cable diameter	see table 2
Cable gland	sensor inputs M16, fieldbus M20
Housing material	
R... DIN rail housing	Polycarbonate
F2... aluminum housing	ALSI12 (Cu) DIN1725 (Si 1.2%), anodized
Protection degree	
R... DIN rail housing	IP20

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Technical data***-TI-Ex8.FF.***

F2... aluminum housing	IP67
Mass	
R... DIN rail housing	360 g
F2... aluminum housing	1800 g
Mounting	panel or DIN rail mounting
Data for application in connection with Ex-areas	
EC-Type Examination Certificate	PTB 03 ATEX 2237
Group, category, type of protection, temperature classification	⊕ II 2(1G/D) G Ex ia IIC T4 , ⊕ II (1)GD [Ex ia] IIC
Bus	FISCO see EC-Type Examination Certificate
Inputs	see EC-Type Examination Certificate
Statement of conformity	PTB 03 ATEX 2238 X
Group, category, type of protection, temperature classification	⊕ II 3G Ex nA II T4 , ⊕ II 3G Ex nL IIC T4 , ⊕ II (3)G [Ex nL] IIC
Electrical isolation	
Bus	see Statement of Conformity
Input	see EC-Type Examination Certificate
Directive conformity	
Directive 94/9/EC	EN 60079-0:2006 , EN 60079-11:2007 , EN 60079-15:2005 , EN 60079-27:2006

Supplementary information

EC-Type Examination Certificate, Statement of Conformity, Declaration of Conformity and instructions have to be observed. For information see www.pepperl-fuchs.com.

Type code/order designation

Type of housing

- F2D0** Field housing, aluminium, IP67
- RD0** without field housing, for mounting in cabinet on DIN rail

Type of device

- TI** Temperature Multi-Input Device

Explosion protection method

- Ex** intrinsically safe

Number of inputs

8

Fieldbus type

- FF** FOUNDATION Fieldbus

Type of connection

without cable gland resp. variant without field housing

- CG** Cable gland, plastic
- CGB** Cable gland, nickel plated brass
- CGS** Cable gland, stainless steel

Type of terminal

- ST** Screw terminal
- SC** Spring cage type terminal

	-	TI	-	Ex	8	.	FF	.		.	
A	-	B	-	C	D	.	E	.	F	.	G

Identification for assignment of the type code to the following tables

Example:

Temperature Multi-Input Device with screw terminals for cabinet mounting on standard DIN rail: RD0-TI-Ex8.FF.ST

Note:

Not all variants are available. For available variants please contact your Pepperl+Fuchs representative.

Dimensions

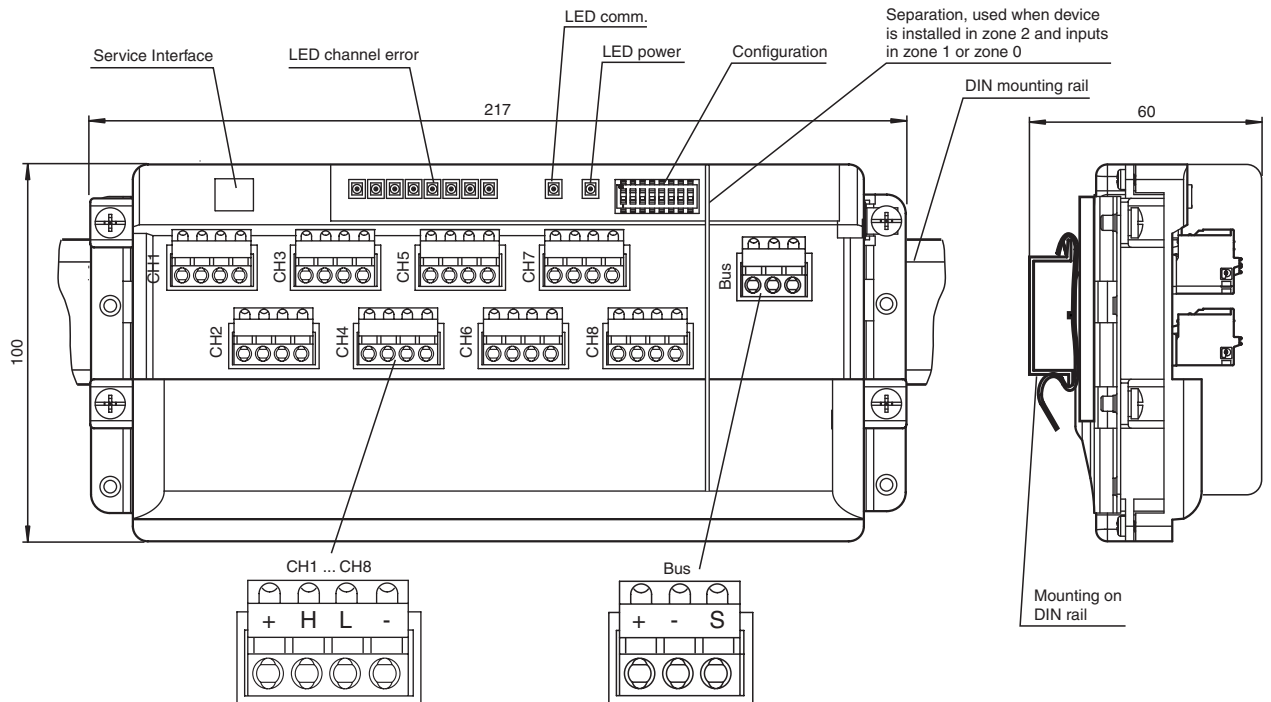


Figure 1: RD0-TI-Ex8.FF for cabinet installation on DIN rail

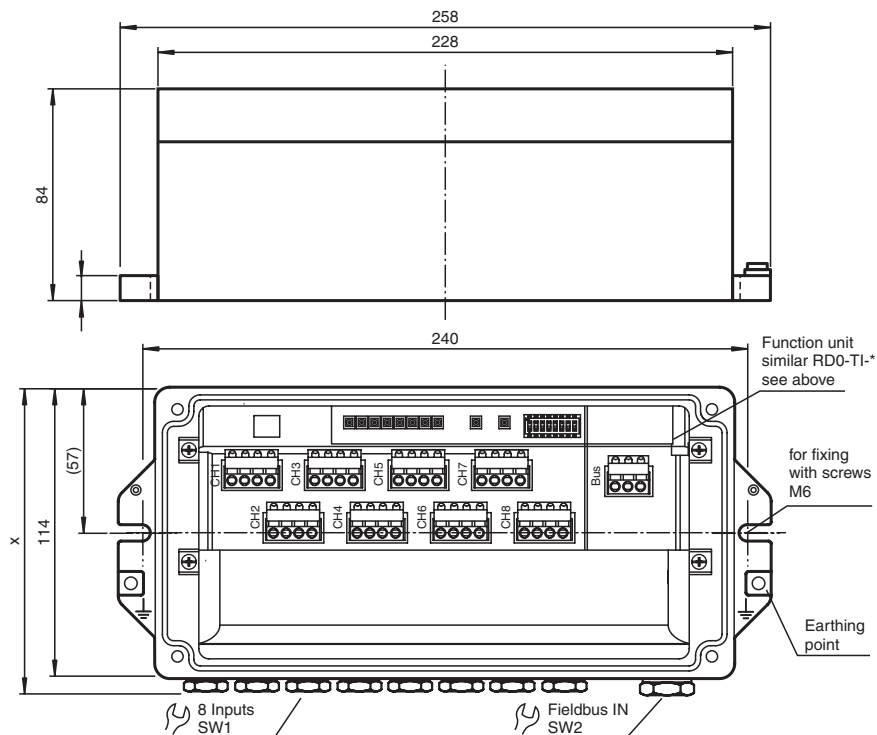


Figure 2: F2D0-TI-Ex8.FF.* with aluminium housing, connection variants and dimensions see tables 1 and 2

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Electrical connection

Table 1: Variations of cable connections, housing types and temperature ranges

Type of connection, identification F	Type of cable connection	Number of inputs, identification D	F2 housing, outside dimension "X" (mm)	Hazardous area use temperature range (°C)	Non-hazardous area use temperature range (°C)
CG	Terminals, cable glands plastic	8	140	-30 ... 70	-30 ... 85
CGB	Terminals, cable glands nickel plated brass	8	140	-40 ... 70	-40 ... 85
CGS	Terminals, cable glands stainless steel	8	140	-40 ... 70	-40 ... 85
without field housing (RD0-*)	Terminals	8	n.a.	-40 ... 70	-40 ... 85

Table 2: Cable diameter depending on cable gland

Type of connection, identification F	Sensors				Fieldbus			
	Type	Material	Cable diameter (mm)	SW1	Type	Material	Cable diameter (mm)	SW2
CG	M16 x 1.5	Plastic	5 ... 10	20	M20 x 1.5	Plastic	5 ... 13	24
CGB	M16 x 1.5	Nickel plated brass	5 ... 10	20	M20 x 1.5	Nickel plated brass	7 ... 12	24
CGS	M16 x 1.5	Stainless steel	5 ... 9	17	M20 x 1.5	Stainless steel	7 ... 12	24

Installation note

see system manual

Spare parts and accessories

Please contact Pepperl+Fuchs.

Additional information

Table 3: Sensor types

Thermocouple			
Type	Standard	Range (°C)	Range (°F)
B	EN 60584-1	300 ... 1800	572 ... 3272
E	EN 60584-1	-200 ... 1000	-328 ... 1832
J	EN 60584-1	-200 ... 1000	-328 ... 1832
K	EN 60584-1	-200 ... 1372	-328 ... 2502
N	EN 60584-1	-200 ... 1300	-328 ... 2372
R	EN 60584-1	0 ... 1768	-32 ... 3214
S	EN 60584-1	0 ... 1768	-32 ... 3214
T	EN 60584-1	-200 ... 400	-328 ... 752
W5Re/ W26Re	ASTM 988-96	0 ... 2000	-32 ... 3632

Input voltage	
Type	Range (mV)
Range 1	-100 ... 150

RTD			
Type	Standard	Range (°C)	Range (°F)
Pt50	EN 60751 (ITS90)	-200 ... 850	-328 ... 1562
Pt100	EN 60751 (ITS90)	-200 ... 850	-328 ... 1562
Pt100	JIS C 1604-1989	-200 ... 630	-328 ... 1166
Pt200	EN 60751 (ITS90)	-200 ... 850	-328 ... 1562
Pt500	EN 60751 (ITS90)	-200 ... 850	-328 ... 1562
Pt1000	EN 60751 (ITS90)	-200 ... 850	-328 ... 1562
Ni100	DIN 43760-1987	-60 ... 250	-76 ... 482
Ni120	Minco standard	-80 ... 320	-112 ... 608
Ni200	DIN 43760-1987	-60 ... 250	-76 ... 482
Cu10	SAMA RC21-4-1966	-70 ... 150	-94 ... 302

Resistance input	
Type	Range (Ohm)
Range 1	0 ... 650
Range 2	0 ... 1300
Range 3	0 ... 2600
Range 4	0 ... 5200

Table 4: Accuracy

Thermocouple				
Type	Range (°C)	Range (°F)	Accuracy	
			(°C)	(°F)
B	300 ... 600	572 ... 1112	± 3.32	± 5.98
	600 ... 1200	1112 ... 2192	± 1.77	± 3.19
	1200 ... 1800	2192 ... 3272	± 1.08	± 1.94
E	-200 ... -50	-328 ... -58	± 0.42	± 0.76
	-50 ... 1000	-58 ... 1832	± 0.31	± 0.56
J	-200 ... 0	-328 ... 32	± 0.48	± 0.86
	0 ... 1000	32 ... 1832	± 0.31	± 0.56
K	-200 ... 0	-328 ... 32	± 0.68	± 1.22
	0 ... 1372	32 ... 2502	± 0.43	± 0.77
N	-200 ... -100	-328 ... -148	± 1.03	± 1.85
	-100 ... 500	-148 ... 932	± 0.54	± 0.97
	500 ... 1300	932 ... 2372	± 0.39	± 0.70
R	0 ... 350	32 ... 662	± 1.93	± 3.47
	350 ... 1768	662 ... 3214	± 1.16	± 2.09
S	0 ... 550	32 ... 1022	± 1.92	± 3.46
	550 ... 1768	1022 ... 3214	± 1.15	± 2.07
T	-200 ... -50	-328 ... -58	± 0.66	± 1.19
	-50 ... 400	-58 ... 752	± 0.35	± 0.63
W5Re/ W26Re	0 ... 800	-32 ... 1472	± 0.80	± 1.45
	800 ... 2000	1472 ... 3632	± 1.05	± 1.89

Input voltage	
Type	Accuracy (µV)
Range 1	± 20

RTD		
Type	Accuracy	
	(°C)	(°F)
Pt50	± 0.77	± 1.39
Pt100	± 0.33	± 0.59
Pt100 JIS	± 0.33	± 0.59
Pt200	± 0.33	± 0.59
Pt500	± 0.31	± 0.56
Pt1000	± 0.31	± 0.56
Ni100	± 0.18	± 0.32
Ni120	± 0.18	± 0.32
Ni200	± 0.18	± 0.32
Cu10	± 2.99	± 5.38

Resistance input	
Type	Accuracy (mOhm)
Range 1	± 115
Range 2	± 230
Range 3	± 460
Range 4	± 920

Table 5: Temperature influence

Thermocouple			
Type	Range (°C)	Range (°F)	Deviation (°C/K)
B	300 ... 600	572 ... 1112	± 0.0060
	600 ... 1200	1112 ... 2192	± 0.0131
	1200 ... 1800	2192 ... 3272	± 0.0242
E	-200 ... -50	-328 ... -58	± 0.0070
	-50 ... 200	-58 ... 392	± 0.0036
	200 ... 1000	392 ... 1832	± 0.0203
J	-200 ... 0	-328 ... 32	± 0.0072
	0 ... 200	32 ... 392	± 0.0039
	200 ... 1000	392 ... 1832	± 0.0243
K	-200 ... 0	-328 ... 32	± 0.0077
	0 ... 500	32 ... 932	± 0.0097
	500 ... 1372	932 ... 2502	± 0.0323
N	-200 ... -100	-328 ... -148	± 0.0080
	-100 ... 500	-148 ... 932	± 0.0088
	500 ... 1300	932 ... 2372	± 0.0264
R	0 ... 350	32 ... 662	± 0.0057
	350 ... 800	662 ... 1472	± 0.0129
	800 ... 1768	1472 ... 3214	± 0.0338
S	0 ... 550	32 ... 1022	± 0.0094
	550 ... 800	1022 ... 1472	± 0.0135
	800 ... 1768	1472 ... 3214	± 0.0355
T	-200 ... -50	-328 ... -58	± 0.0071
	-50 ... 200	-58 ... 392	± 0.0035
	200 ... 400	392 ... 752	± 0.0067
W5Re/ W26Re	0 ... 800	-32 ... 1472	± 0.0151
	800 ... 2000	1472 ... 3632	± 0.0552

Input voltage	
Type	Deviation (µV/K)
Range 1	± 2

RTD	
Type	Deviation (°C/K)
Pt50	± 0.010
Pt100	± 0.010
Pt100 JIS	± 0.010
Pt200	± 0.010
Pt500	± 0.010
Pt1000	± 0.010
Ni100	± 0.010
Ni120	± 0.010
Ni200	± 0.010
Cu10	± 0.010

Resistance input	
Type	Deviation (mOhm/K)
Range 1	± 6
Range 2	± 6
Range 3	± 13
Range 4	± 26

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